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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,429	02/20/2004	Ronald D. Knudsen	210453US01 (4081-04401)	6369

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EXAMINER

MCDONOUGH, JAMES E

ART UNIT	PAPER NUMBER
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1755

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/783,429	Applicant(s) KNUDSEN ET AL.	
	Examiner James E. McDonough	Art Unit 1755	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-68 is/are pending in the application.
- 4a) Of the above claim(s) 4, 10, 25-30, 32-37, 39-42, 44 and 49-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-9, 11-24, 31, 38, 43, 45-48, and 51-68 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's arguments, see page 12, lines 11-23, filed 12/7/2006, with respect to claims 2, 42, and 43 have been fully considered and are persuasive. The rejection of claims 2, 42, and 43 has been withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 54-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reagan in view of Manzer as cited in and for the reasons of record given in paragraph 5 of the final rejection mailed 5/24/06.

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Reagan discloses the invention substantially as claimed (abstract; Fig. 1; column 3, line 18 to column 3, line 33; column 6, line 58 to column 6, line 64; column 8, line 37 to column 8, line 68; column 9, line 57 to column 9, line 68; column 10, line 18 to column 10, line 22; column 11, line 11 to column 11, line 19; column 11, line 45 to column 11, line 66; column 12, line 50 to column 13, line 32; column 14, line 37 to column 14, line 68; column 15, line 55 to column 15, line 68; and column 17, line 6 to column 17, line 10)

Reagan lacks explicit disclosure that a non-halide metal alkyl can eliminate water from any of the reagents used in the preparation of its compounds, or that water may also be removed by distillation of its azeotropes with any number of solvents with which it forms azeotropes, although the disclosure is rife with references to the need to work in anhydrous conditions in order to prepare and use its catalysts.

However, Manzer explicitly teaches that organoaluminum compounds, a species of non-halide metal alkyl, can indeed remove trace water from compounds analogous to those of the present claims (column 6, line 35 to column 6, line 44). In addition, distillation of azeotropes of water using other solvents with which water forms azeotropes using Dean-Stark traps is a conventional technique for removing trace water from liquids, e.g. the purification of grain alcohol i.e. ethanol to 100% by addition of benzene to the 95% pure material normally obtained in the distillation of grain spirits followed by distilling this mixture which removes an azeotrope of benzene and water,

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leaving behind benzene and ethanol which can be separated by ordinary distillation since benzene and ethanol do not form an azeotrope, i.e. a constant boiling mixture of two liquids.

It would have been obvious to one of ordinary skill in the art to apply the teaching Manzer to the disclosure of Reagan with a reasonable expectation of obtaining a highly-useful method of making an olefin oligomerization catalyst with the expected benefit of higher yield of the catalyst because less of its precursors are destroyed by reaction with water as an impurity in the reactants and solvents used to make the catalyst.

Response to Arguments

Claims 1-3, 5-24, 31, 39-42 and 46-51 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Reagan in view of Manzer as cited in and for the reasons of record given in paragraph 5 of the final rejection mailed 5/24/06.

Applicant's arguments filed 12/7/2006 have been fully considered but they are not persuasive.

(1) "the reaction preferably occurs in the absence ... moisture"

This reads on abating some or all of the water furthermore, use of an aluminum alkyl to dry reagents would also have the affect of removing acidic protons.

(2) Although, as the Examiner states, at page 3 paragraph 1 of the Office Action dated September 7, 2006, Reagen discloses the use of aluminum alkyls in the composition, nowhere is it recited that the composition comprising the chromium-containing compound is contacted "with a non-halide metal alkyl prior to contact thereof with a composition comprising the metal halide-containing compound."

Reagan also teaches that the reagents can be combined in any manner under conditions suitable to form an effective catalyst and, since the catalyst will be degraded by the presence of either water, oxygen, or acidic protons and since metal alkyls can sequester all of these, it would have made it obvious to add the metal alkyl first to dry the reagents. Also adding the metal halide in the presence of water or acidic protons would generate hydrogen halides such as HCl, which are corrosive and preferably avoided (column 11, line 45 to column 11, line 66; column 14, line 27 to column 14, line 36; column 14, line 57 to column 14, line 68;).

(3) Specifically, Manzer teaches, at column 6 lines 35-37, that "the diluent should be anhydrous and preferably is made so by passing it through highly absorptive alumina" Although Manzer, column 6 lines 38-42, discloses that "the liquid diluents can also be freed of contaminants such as oxygen and water by treatment with traces...of the organoaluminum compound to be used as a catalyst component in the polymerization," he nowhere discloses abating "all or a portion of the water, acidic

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protons, or both from the composition comprising the chromium-containing compound by contact thereof with a non-halide metal alkyl prior to contact thereof with a composition comprising the metal halide-containing compound" or that "the composition comprising a chromium-containing compound further comprises acidic protons, water, or both" as disclosed in amended claim 1.

Manzer discloses removing (abating) water from feed stocks using the acid alumina treatment along with metal alkyl to ensure maximum removal of water. This would also have the affect of removing acidic protons through reaction with the metal alkyl. Furthermore, it is well known that many feed stocks contain traces of water and/or acidic protons that need to be removed before use in reactions that are sensitive to water and/or acidic protons (column 15, line 55 to column 16, line 2 and column 6, line 35 to column 6, line 44).

(4) Furthermore, in direct opposition to the instant case, Reagen teaches, at column 14 paragraph [4], "the reaction can also take place in the presence of a halide source." And further, at column 14 paragraph [6], Reagen teaches that "the chromium source, the metal alkyl, and/or unsaturated hydrocarbon can contain and provide a halide to the reaction mixture."

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Please note that Reagan states "the reaction **can** also take place in the presence of a halide source.", **not** that it has to take place in the presence of a halide source (column 14, line 27 to column 14, line 36).

(5) Analogously to claim 1, amended independent claims 23, 24, 31, 43, and 46 also recite the limitations 1) that "water, acidic protons, or both are abated from the composition comprising the chromium-containing compound," and 2) that the abatement occurs prior to formation of the catalyst.

Reagan also teaches that the reagents can be combined in any manner under conditions suitable to form an effective catalyst and, since the catalyst will be degraded by the presence of either water, oxygen, or acidic protons and since metal alkyls can sequester all of these, it would have made it obvious to add the metal alkyl first to dry the reagents. Also adding the metal halide in the presence of water or acidic protons would generate hydrogen halides such as HCl, which are corrosive and preferably avoided (column 11, line 45 to column 11, line 66; column 14, line 27 to column 14, line 36; column 14, line 57 to column 14, line 68;).

Claims 43-46, 52 and 53 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Reagan in view of Furtek as cited in and for the reasons of record given in paragraph 6 of the final rejection mailed 5/24/06.

Applicant's arguments filed 12/7/2006 have been fully considered but they are not persuasive.

(1) Furtek discloses, column 11 paragraph [5], "prior to use, the diluent should be purified, e.g., by percolation through silica gel and/or molecular sieves, to remove traces of water, oxygen, polar compounds, and other materials," but nowhere discloses that water, acidic protons, or both are abated "from the composition comprising the chromium-containing compound, a composition comprising the pyrrole-containing compound, or both. "

Polar compounds reads on acidic protons.

Since Furtek discloses water and/or acidic protons are removed from the solvent to prevent deleterious effect of these impurities on the catalyst, it would be obvious to also remove these impurities from the other feedstocks that contain these impurities (column 11, line 38 to column 11, line 61).

(2) As discussed in Section I above, Reagen also fails to disclose that the abatement is performed "prior to contact thereof with a composition comprising the metal halide-containing compound." Nowhere does Furtek teach this missing limitation.

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Reagan also teaches that the reagents can be combined in any manner under conditions suitable to form an effective catalyst and, since the catalyst will be degraded by the presence of either water, oxygen, or acidic protons and since metal alkyls can sequester all of these, it would have made it obvious to add the metal alkyl first to dry the reagents. Also adding the metal halide in the presence of water or acidic protons would generate hydrogen halides such as HCl, which are corrosive and preferably avoided (column 11, line 45 to column 11, line 66; column 14, line 27 to column 14, line 36; column 14, line 57 to column 14, line 68; and column 15, line 55 to column 15, line 63).

(3) Analogously to claim 43, claim 46 now includes the limitations "abating all or a portion of water, acidic protons, or both from the composition comprising the chromium-containing compound" and performing the abatement "prior to formation of the catalyst." As discussed in Section I above, Reagan and Furtek fail to teach these elements of claim 46.

Reagan also teaches that the reagents can be combined in any manner under conditions suitable to form an effective catalyst and, since the catalyst will be degraded by the presence of either water, oxygen, or acidic protons and since metal alkyls can sequester all of these, it would have made it obvious to add the metal alkyl first to dry the reagents. Also adding the metal halide in the presence of water or acidic protons would generate hydrogen halides such as HCl, which are corrosive and preferably

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avoided (column 11, line 45 to column 11, line 66; column 14, line 27 to column 14, line 36; column 14, line 57 to column 14, line 68; and column 15, line 55 to column 15, line 63).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James E. McDonough whose telephone number is (571)272-6398. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JEM 12/19/2006

Aileen Felton
AILEEN FELTON
PRIMARY EXAMINER